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THE EFFECTS  
OF THE  
ABUSE OF ALCOHOL  
ON THE  
Circulatory and Respiratory Organs,

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BY

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*ERRATA.*

On page 9, 20th line, for "diastole," read "systole."

On page 12, 15th line, for "insiduous," read "insidious."

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# The Effects of the Abuse of Alcohol on the Circulatory and Respiratory Organs.

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With but few exceptions the exhilarating, the damaging ingredient of all of the so-called stimulating drinks is alcohol. It matters not whether they be in the form of spirituous liquors, cordials, still wines of high and low grades, the most delicate champagnes, ales or beers.

It is true that in some instances, either to add to the gains of the dealer, or to improve the flavor, or to impart peculiar stimulating or intoxicating properties, substances are added which are in themselves poisonous, in rare instances even more poisonous than alcohol itself. Thus, fusil oil is found added to some brandies, and gin, the favorite drink of the toper, the lining membrane of whose pharynx, oesophagus and stomach have become tanned, so to speak, is made fiery and at the same time smooth, by the addition of oil of vitriol, oil of juniper, alum, carbonate of soda, turpentine, etc., all helping to impart to the popular beverages their peculiar flavors and properties. But of all poisonous substances added to alcohol in the preparation of palatable drinks, the essence of absinthium or wormwood is the most injurious. In addition to its destructive effects upon the stomach, it has been known to produce in man, as it does in the lower animals, a species of epilepsy, the condition becoming lasting where the use of the poison is continued. As is well known, wormwood, aside from alcohol, is the active ingredient of the popular cordial known as absinthe.

But it is of the effects of the abuse of alcohol that we propose to treat, and enough can be truthfully said on the subject to satisfy every thinking man that the constantly working, and in health, never tiring heart, is invariably weakened in its action, and often, very often, permanently ruined by the con-



stant use of stimulating beverages; and so, too, with those equally important and vital organs, the lungs and air passages.

As in our heading we use the term "abuse of alcohol," it is but proper that we should have some understanding as to what constitutes abuse in this connection.

It is undoubtedly true that some constitutions are far more susceptible to the action of alcohol than others. It is also true that in some, the effects are more marked on the nervous system, in others on the digestive organs, in others on the kidneys, and in others on the circulatory and respiratory organs. How often have we as physicians been called to treat diseases resulting from the habitual use of alcoholic beverages in patients who considered themselves temperate men or women, and who boasted that they were never under the influence of liquor in their lives, while at that very time they were dying of Bright's disease, cirrhosis of the liver, chronic gastritis, brain or spinal disease, fatty degeneration of the heart, chronic bronchitis, with emphysema of the lungs, or even of pulmonary consumption, resulting alone from the long continued use of some of the many fascinating drinks containing alcohol.

It will be difficult for us to give an intelligible idea of what constitutes abuse, or rather what may be considered the moderate use of alcohol. My own opinion accords with that of the great investigator, hygienist and physician, Benjamin W. Richardson, M.D., F.R.S., whom I shall have occasion to quote in this article as authority for statements made. He says: "This chemical substance, alcohol, an artificial product designed by man, for his purposes, and in many things that lie outside his organism a useful substance, is neither food, nor a drink, suitable for his natural demands. Its application as an agent that shall enter the living organism is properly limited by the learning and skill possessed by the physician, a learning that itself admits of being recast and revised in many important details and perhaps in principles."

"If this agent do really for the moment cheer the weary, and impart a flush of transient pleasure to the unwearied who crave for mirth, its influence (doubtful even in these modest and moderate degrees) is an infinitesimal advantage by the side of an infinity of evil for which there is no compensation

and no human cure." Still we occasionally have evidence presented to us that the daily moderate use of alcoholic preparations may be continued for many years with no apparent injury in some individuals, and very frequently equally strong evidence that the same moderate use will produce in others serious, and in many cases fatal, chronic diseases. It is true that permanent injurious results rarely follow the occasional use or even abuse of stimulants, for if the patient be of healthy constitution the system has opportunity to entirely recover from the toxicological effects before the indiscretion is repeated. This will explain why so many periodic drinkers live to a good old age and die from natural causes.

As an answer to the question: What constitutes abuse in the use of alcohol? I most unhesitatingly assert that *habitual use is abuse, even if the quantity be small.* It is no argument against the truth of this statement that men have lived to be eighty or ninety years of age in tolerable health, who have used alcohol in moderation the greater portion of their lives. Perhaps if they had abstained entirely they would have lived to be ninety or one hundred, and enjoyed still better health. Certain it is that alcohol is a poison. That but a small portion of what is taken into the system is eliminated as alcohol. That, to a certain point, what remains is decomposed. That in this process of decomposition or oxidation it does not supply nutriment to the body, neither does it supply muscular strength or animal warmth, for this oxidation is "at the expense of the oxygen which ought to be applied to the natural heating of the body." That the product of its decomposition is a poisonous substance which, circulating as it does, through every portion of the body, injures the delicate texture of the various organs, and interferes with their functions to a greater or less extent, according to the amount present or the susceptibility of the organs to its action. That even the accumulation of fat which sometimes follows the continued use of certain alcoholic beverages, if it results at all from the alcohol contained in them, is produced by "indirect and injurious interference with the natural processes."

But to the subject of our paper, "*The Effects of the Abuse of Alcohol on the Circulatory and Respiratory Organs.*" At the

present day all are familiar with the physiological action of Nitrite of amyl. We know that it has a paralyzing effect on the vaso-motor nerves, and that the muscular fibres of the arterioles throughout the entire body lose their power of contraction, the vessels become dilated, not on the surface alone but everywhere. The heart, which has been kept in check by the tension of their walls, is relieved of a portion of its labor, and as a locomotive increases its speed rapidly on the breaking of the coupling which attaches it to the train behind, so the heart's action is increased in frequency. This fact, in connection with the action of Nitrite of amyl, has been taken advantage of by physicians throughout the civilized world to relieve the arterial spasm which causes the overloading and distending of the heart in that dreadful condition known as angina pectoris. The drug, like alcohol, has its uses, but it is, nevertheless, a poison. To a less extent alcohol acts in precisely the same way, paralysing the vaso-motor nerves, dilating the arterioles, increasing the frequency of the heart's action. Richardson, in referring to this, says: "If you attend a large dinner party, you will observe after the first few courses when the wine is beginning to circulate, a progressive change in some of those about you who have taken wine. The face begins to get flushed, the eye brightens, and the murmur of conversation becomes loud. What is the reason of that flushing of the countenance? It is the same as the flush from blushing, or from the reaction of cold, or from the Nitrite of amyl. It is the dilatation of vessels following upon the reduction of nervous control, which reduction has been induced by the alcohol. In a word, the first stage, the stage of vascular excitement from alcohol has been established."

As was before stated, if the indiscretion stop here, provided the subject be a healthy one, the paralyzing effect of the alcohol soon passes away. The walls of the vessels regain their tone, the vessels resume their former calibre, the old obstacle is offered to the too free emptying of the heart, and the undue frequency of action disappears; but if the indiscretion be soon repeated again and again, by and by, a condition of permanent vaso-motor paralysis is established. The vessels become permanently dilated, the heart's action permanently increased in frequency.

If this was the only effect of alcohol, it is easy to prove that from this, and this alone, serious injury, permanent injury, injury calculated to shorten life, would result to the circulatory and respiratory organs. But its action does not stop here. The poison generated by the combustion of alcohol in the system produces cellular changes everywhere; by its contact with the blood-discs, changes are produced in them; by its mixing with the serum of the blood, changes, injurious changes, are produced here, the character of the blood is changed, the heart, the arterial walls, the elastic lung tissue, the muscular fibre of the bronchial tubes, the mucous membrane lining them and the upper air passages, the muscles concerned in respiration, all receive impure, poisoned blood and are damaged accordingly. The immediate action of alcohol on the nervous system, the digestive organs and kidneys, will be considered by my associates in the bureau.

What is the result, so far as the circulatory and respiratory organs are concerned, of this dilatation of the blood-vessels, of this increased frequency of the heart's action, of this poisoned, this pathologically changed blood?

As a certain number of years are allotted for the life of man, so a certain number of heart strokes, of respiratory movements, are allotted. If the life of a healthy man should extend three score and ten, or four score years, with the heart beating after maturity at the rate of seventy a minute, and with eighteen respiratory movements in the same length of time; with a heart beating at eighty and with twenty-one respirations to the minute, his life from the time of commencement of the excess would be shortened by about one-seventh. This, in itself, would seem to many a serious and unfortunate result, but this is not all. The life, in by far the greater majority of cases owing to the discomfort produced, is rendered miserable, and in some instances death, to the individual, and frequently to his relatives and friends, is a welcome visitor. From overwork alone the heart would be prematurely worn out.

The diseases resulting immediately or secondarily from the abuse of alcohol, so far as these organs are concerned, may be enumerated as follows:

Dilatation of the heart. Hypertrophy of the heart.

Endocarditis. Pericarditis. Valvular disease of the heart.

Fatty deposit on the heart and infiltration of the walls of the heart with fat. Fatty degeneration of the heart.

Aneurism of the walls of the heart, and rupture of the heart.

Fibroid disease of the walls of the arteries.

Fatty and calcareous degeneration of the walls of the arteries.

Aneurisms of the arteries.

Nasal, pharyngeal, laryngeal and bronchial catarrh.

Pulmonary emphysema. Asthma. Pneumonia.

Pulmonary phthisis. Pleuritis.

We will now attempt briefly to state how these conditions can be produced by the continued use of alcohol, and the results arising from them.

#### DILATATION OF THE HEART.

The fact being established that the first effect of alcohol is to quicken the heart's action, it can readily be understood how the walls of the heart may become hypertrophied by this continual over-action, for the muscular fibres of the heart, like those of other muscles, are thickened by over-exertion, provided the nutrition of the organ is good, and, too, it has been established, that new muscular fibres are formed in the walls of a heart that has an excessive amount of work to do, and under such circumstances we do not look on this hypertrophy as a disease, but as nature's method of compensating for the amount of extra labor to be performed. But in habitual drinkers of alcohol the nutrition of the heart is not good, and particularly if there be inherent weakness from other causes; instead of the walls becoming hypertrophied from increased growth of old muscular fibres and the development of new, the muscular fibres atrophy, and the heart walls during systole are no longer able to empty the chambers of the organ, which being partially filled during the diastole, instead of being empty as they should be, the incoming blood from the veins to the auricles, and from the auricles to the ventricles, stretches the relaxed muscular fibres, and the heart walls become dilated enlarging the capacity of the chambers. If on the first evidences of heart failure from dilatation of its walls the excesses

be suspended, provided the subject be free from complicating diseases, the muscular fibres will regain their former strength and return to their normal condition, but if the excess is continued the well-known consequences of dilatation follow. Pulmonary engorgement, over-distension of the systemic veins, percolation of serum through their walls, general dropsy and finally death.

#### HYPERTROPHY OF THE HEART.

We have just alluded to the manner in which the heart walls may become hypertrophied from too rapid action as a result of the paralysis of the walls of the arterioles, accompanying the early stages of alcoholism, but, as we shall learn later, there is another stage in which, notwithstanding the paralyzed condition of the vaso-motor nerves, the lumen of these vessels is actually diminished, then comes resistance to the emptying of the heart, and if the nutrition of the organ be fairly good, compensating hypertrophy gradually takes place, and the heart in its strengthened condition does good work for a long period of time, till death comes from the rupture of an atheromatous cerebral artery, from the rupture of an aneurismal sac, from uraemic poisoning, as a result of kidney changes, or from heart degeneration with pulmonary oedema, the pathological conditions mentioned, as will be seen further on, being but a portion of a general disease process resulting from the abuse under consideration.

#### ENDOCARDITIS.

It is well known that acute inflammation of the endocardium is a frequent complication of articular rheumatism, and it is well established that this complication is owing to the presence of lactic acid in the blood in this disease. Endocarditis is also a complication of other diseases, characterized by the presence of acids of a different nature in the blood. It is often found as a complication of so-called Bright's disease, but there is a doubt in my mind as to the endocarditis being the result of the changed condition of the kidneys; rather is it the result of the poisoned state of the blood which has itself really given rise to the kidney degeneration. Lithæmic subjects suffer from fibroid and granular degeneration of the kidneys arising un-

doubtedly from the changes which first commence in the walls of the arterioles of those organs owing to the excess of waste material (uric acid) in the blood. The endocardium is sensitive to the action of acid poisons, and how common is it for the blood of persons addicted to the use of alcohol to be loaded with lithic acid and other poisons, resulting from the oxidation of the alcohol taken into the system. Is it surprising then that acute endocarditis should result directly from the abuse of alcoholic beverages? That it does there is no doubt, for *post-mortem* examinations in cases of death from acute alcohol poisoning have proved it. The consequences of endocardial inflammation, whether it arise from this or other causes, are too well known to require mention. In the majority of cases changes take place in the edges of the valves which progress and cripple the heart for life.

#### PERICARDITIS.

Acute inflammation of the pericardium is almost as common a complication of rheumatism as endocarditis, *but* it is not so easy to surmise the cause as in endocarditis. So is it a complication of lithæmia, and as lithæmia is one of the most direct and common results of the excessive and prolonged use of alcohol, we can assert without fear of contradiction that pericarditis results directly from the presence in the blood of waste material and poisonous substances which would not be there were it not for the excess referred to. In this disease, as well as in endocarditis, there is probably generally an exciting cause for its development, but a cause which would be inoperative were it not for the predisposition resulting from the alcoholic dyscrasia. Although pericarditis is not generally fatal in its results, adhesions of the two layers almost invariably follow the absorption of the exudation, and the heart is hampered in its action through life.

#### VALVULAR DISEASE OF THE HEART.

We have alluded to valvular deformity as a result of the endocarditis complicating alcoholism. As it is secondary to endocardial inflammation, so is it late in life a result of the arterial changes arising from alcoholism which will be de-

scribed further on. Atheromatous degeneration of the aorta near its root readily extends to and involves the segments of the semilunar valve at the aortic orifice, as a result, deformities from fibroid growth and calcareous degeneration result. Frequently too, from the narrowing of the lumen of the arterioles owing to the thickening of their walls to be described later, the recoil against the aortic valves during diastole and the strain of the mitral during the systole of the ventricle are so great that a chronic inflammation results with fibroid thickening, the newly developed tissue subsequently contracting producing deformities resulting in insufficiency or constriction or both. In some instances the valves yield to the pressure which they are called on to sustain, and are lacerated. Inflammation follows and by its consequences adds to the valvular derangement.

The result of valvular deformity in every instance, whether it constricts the orifice or permits regurgitation, is to obstruct the blood-current at the orifice involved. As a consequence there is imperfect emptying of the chamber back of this orifice during the diastole of its walls and dilatation follows; if the nutrition be fairly good, compensating hypertrophy gradually takes place, and, to a certain extent, the injury is overcome, but the patient is crippled for life.

#### FATTY DEPOSIT ON THE HEART AND INFILTRATION OF THE WALLS OF THE HEART WITH FAT.

Although it has been asserted in this article that alcohol in itself does not form fat in the body, it is notorious that many habitual drinkers—and, too, including some who partake of but little food, owing to the catarrhal conditions of the stomach resulting from their habits—accumulate fat rapidly; particularly is this true in reference to ale and beer drinkers.

Richardson, in discussing this fatty tendency on the part of habitual drinkers, says: "The fattening may not be due to the alcohol itself, but to the sugar or the starchy material that is taken with it. As a matter of general experience on which I have tried to arrive at the truth, I am led to the conclusion that pure spirit drinkers among men, I mean those who do not mix sugar with the spirit, and who dislike spirit which is

artificially sweetened, are not fattened by the spirit they take. This tallies also with the observations on the action of absolute alcohol on inferior animals, for they certainly, under that influence if they are allowed liberty to move freely, do not fatten. Alcohol when it is largely taken, unless the will of the imbibers be very powerful, is wont to induce desire for undue sleep or, at least, desire for physical repose; under such conditions there is an interference with the ordinary nutrition processes. The wasted products of nutrition are imperfectly eliminated, the respiration becomes slower and less effective, and there is set up a series of changes leading, independently of the alcohol as a direct producer of fat, to the development and deposit of fatty tissue in the body."

In the obese, fat is not alone deposited on the surface of the body. It is with man, as with animals fattened for market—the appearance of prize beef is familiar to all—fat nearly everywhere, between the muscles, in and between the muscular fibres, on the heart, beneath the pericardium, along the edges of the lungs.

Certain it is that habitual drinkers, particularly those who confine themselves mainly to malt liquors, grow fat and die many years before the allotted time of man. Such are found *post-mortem* to have fatty hearts.

This condition of a few ounces of fat deposited on the organ to a certain extent hampers its action; it has a greater daily amount of work to do, and fails earlier than would otherwise be the case. It is not supposed that the muscular fibres themselves are weakened by the mere presence of fat around them, so long as there is no actual fatty degeneration of tissue.

#### FATTY DEGENERATION OF THE HEART.

Although fatty degeneration of the muscular fibres of the heart frequently co-exists with fatty deposit, it is quite as often found where there is no undue deposit of fat on the heart, and it is even said to be rare as an accompaniment of fatty infiltration.

The causes of fatty degeneration are faulty nutrition of the organ from a deteriorated or poisoned condition of the blood, or from improper blood supply resulting from obstruction to

the current through the coronary arteries. The former is found where the blood is loaded with waste material resulting from improper oxidation of effete tissue, and in anaemia resulting from a diminished supply of red blood-corpuscles with excess of white, and in the same condition resulting from pathologically changed blood-discs; the latter where there is insufficiency of the aortic valves with the consequent regurgitation during the diastole of the ventricles, and where the coronary arteries are tortuous and atheromatous.

Each of these pathological states results directly from the continued use of alcoholic beverages; consequently, as the effect follows the cause, we are safe in asserting that fatty degeneration of the heart is not an uncommon result of prolonged excess in this direction.

Although it is a mooted question as to whether it is possible for new muscular fibres to take the place of the old ones which have become converted into fatty debris (necrosed), all agree that a heart which has become degenerated to any extent is in by far the greater majority of cases permanently disabled, and that owing to its enfeebled condition venous engorgement of the various organs of the body may result, and to such an extent as to disturb their function sufficiently to be incompatible with life itself; or that acute œdema of the lungs, as a direct result of weakened heart's action, may destroy the life of the patient; or that the heart may suddenly fail during its diastole, owing to shock, or sudden change from the recumbent to the upright position, the result of course being instant death. Several cases of death from fatty degeneration of the heart, from each of the above causes, have come under the writer's immediate observation.

#### ANEURISM OF THE HEART AND RUPTURE OF THE HEART WALLS.

In rare instances fatty degeneration of the heart exists to but a limited extent. In small areas there is obstruction of the minute branches of the coronary artery. The part involved not being properly nourished degenerates, and of course becomes weakened, and as during the systole of the heart the pressure is equal in all parts of the ventricle the weakened portion yields and bulges, as does a weakened portion of the aorta during systole of the ventricle, it is readily seen that quite a

large aneurism may result which eventually ruptures, or the degenerated portion may rupture on the first extra violent systole of the ventricle from any cause. Of course death under such circumstances is the inevitable result. Although these conditions may not be considered the immediate results of alcoholism, they are the immediate results of the degenerative process which can be and frequently is caused by the abuse of alcoholic drinks.

We now come to the consideration of the most interesting pathological changes which may result from the long continued use of alcoholic beverages, viz.: Fibroid disease of the walls of the arteries, from which some of the conditions already described are the immediate result. It would carry us too far were we to attempt to go fully into the consideration of this insidious disease which, in by far the greater number of cases where it exists, results directly from the abuse, the effects of which we are considering. Hypertrophy of the left ventricle of the heart which is a constant accompaniment of the form of Bright's disease known as contracted kidney, was till recently supposed to arise from the obstruction the blood met with in its passage through the kidneys, owing to their cirrhotic state, and the narrowing of the lumen of their arterioles and capillaries. It was conceded by all that this condition was a frequent result of the prolonged use of alcoholic drinks. Recent investigations have proved that in the disease mentioned, this condition of the arterioles is not confined to the kidneys, and that the walls of these vessels throughout the entire body are involved in a general vascular lesion, viz.: hypertrophy of their longitudinal and circular muscular fibres with hyperplasia of fibrous tissue cells, the latter involving the capillaries as well, the connective tissue resulting, subsequently contracting, in accordance with the general law governing newly developed connective tissue and narrowing the calibre of the vessels, the hypertrophy of the heart being nature's method of compensating the obstruction to the blood current thus produced. Why is this contraction of the kidneys, this change in the walls of the smaller arteries and the capillaries, this hypertrophy of the left ventricle of the heart so frequently found in those who have been habitual drinkers of alcoholic beverages?

We have made the assertion that alcohol is itself a poison. Entering the blood it produces pathological changes here, the blood-discs are changed in shape, they are made to adhere to each other, in some instances clogging the capillaries, their function as oxygen bearers is impaired. It produces by its toxic effects cellular changes in every portion of the body, particularly is this seen in the stomach, the duodenum, the liver and the endothelial lining of the arteries, the arterioles, the capillaries and the veins. Thus by its presence alone serious injuries result, but in addition it interferes with the proper elimination of waste material, "and directly leads to the formation of excess of uric acid in the blood, more than can be eliminated or destroyed in the system," by disturbing the action of the digestive organs, and by interfering with the functions of the liver and kidneys, and by developing indolent and lazy habits so far as physical exertion is concerned, all combining to induce excess of waste material in the blood, and to prevent its proper elimination. A condition of chronic lithiasis results, precisely similar to that found in gouty subjects who have acquired the disease by inheritance, or by the excessive eating of nitrogenous food. Gout is frequently attributed to these latter causes, but it will generally be found on inquiry that in addition, the habitual use of alcoholic beverages has been common with such subjects.

This excess of uric and other acids in the blood acts as a local irritant to the endothelial lining of the blood-vessels, finally bringing about the condition mentioned. Degenerative processes are liable to take place in this newly formed tissue, first fatty, later possibly calcareous degeneration. What is the result? As was before stated, the heart suffers through want of proper food supply, and the conditions already enumerated follow, for its tortuous and atheromatous blood-vessels cannot carry and supply the normal amount of blood to its muscular walls. The walls of the blood-vessels throughout the system generally are weakened owing to degenerative changes—consequently with an hypertrophied heart back of them pumping at times with great force, they sometimes yield and aneurisms result, or during excitement or violent physical effort a vessel may rupture, particularly is this common in the spleen, in the

lungs and in the brain, for in these localities the walls of the vessels are not well sustained by support from the surrounding tissues. If in the spleen or lungs haemorrhagic infarction results; if in the brain apoplexy, in fact the latter condition is the most common cause of death in lithæmic subjects who die in the prime of manhood; later, unless they die of some disease contracted accidentally, and which, owing to their lack of resisting power, they have not the strength to withstand, they succumb to fatty degeneration of the heart, granular kidneys, abscess of the kidneys, resulting from calculi, stone in the bladder, cirrhosis of the liver, chronic catarrh of the stomach, intestines or bladder, or all combined, prostatitis, chronic bronchitis, pneumonia or pulmonary phthisis, resulting directly from the abuse of alcohol.

#### EFFECT ON THE RESPIRATORY ORGANS.

We have already extended our paper so far that we shall necessarily be brief in what we have to say of the effects of the abuse of alcohol on the respiratory organs. We beg to call your attention again to our definition of abuse, viz., habitual use.

Niemeyer says, and truthfully, "Whenever there is hyperæmia of mucous membrane, active or passive, the condition known as catarrh is also more or less distinctly observable," and every physician in active practice will confirm the statement of this great pathologist, that "habitual topers almost always have catarrh of the pharynx in which the laryngeal mucous membrane takes a part."

The paralyzing effect of alcohol on the vaso-motor nerves and the resulting dilatation of the arterioles and capillaries which is general, of course extends to the mucous membrane lining the air passages. We, therefore, have the hyperæmia, which is always accompanied to a greater or less extent by the condition known as catarrh; but there seems to be an inherent predisposition in some from the same exciting cause, to catarrh of the pharynx and nasal passages; in others to catarrh of the larynx and trachea, and in others to bronchial catarrh. In some all of these mucous surfaces are

equally susceptible. Certain it is that nearly all habitual users of alcoholic beverages suffer to a greater or less extent from catarrh of one or all of these mucous membranes. Long continued hyperæmia of a part produces cellular hyperplasia, consequently in time the mucous membrane is thickened—hypertrophic catarrh—and still later owing to the contraction of the newly formed fibrous tissue, we may have the condition known as atrophic catarrh, in which the membrane is so pathologically changed that its function is permanently destroyed.

In the larger air passages, aside from disturbance of function, no serious consequences result, unless there be a predisposition to tubercular troubles or a syphilitic complication. Not so in the smaller air passages; their lumen is diminished, not only by the hyper-secretion, but by the increase of tissue. Inspiration being an active process, in which many powerful muscles are concerned, air can readily find its way through these constricted air passages to the air vesicles; but as it is expelled from these by the elasticity of the lung fibres alone, it is readily seen that they will become over-filled and distended; and later, owing to the pressure of the air on the two sides of the walls of the vesicles, their blood supply is interfered with, and they atrophy and finally break down, and several vesicles are merged into one large air sack, and a condition of permanent pulmonary emphysema is established. The results of this condition are too well known to require but mere mention; permanently diminished vital capacity; dyspnoea on the slightest exertion; obstruction to the free emptying of the right heart with consequent dilatation, and if the nutrition be good, subsequent hypertrophy; but until this hypertrophy is established, venous engorgement of every organ of the body, the brain, liver, stomach and intestinal canal, kidneys, etc., with pronounced disturbance of their functions. As a direct result, too, even without hereditary predisposition, owing to nervous irritation resulting from the bronchitis and emphysema, we have in some, severe attacks of asthma.

We are all familiar with the aetiology of lobular, broncho or catarrhal pneumonia, we know that in every instance an at-

tack is preceded by a bronchial catarrh, and that this bronchial catarrh is the direct cause of the difficulty, aided in some instances by a predisposing cause, none greater, aside from a phthisical tendency, than alcoholism, this form of pneumonia differing materially from croupous or lobar pneumonia, the aetiology of which is not settled, and which never attacks a single or a few lobules, but always an entire lobe, and which is not preceded by a bronchial catarrh, but which is primarily a lung inflammation.

The latter disease rarely leaves any sequelæ behind; in nearly every instance it terminates in entire restoration to health, or death, while lobular pneumonia frequently develops pulmonary ulceration—necrosis of lung tissue—which is nothing more or less than pulmonary phthisis. If the factors are present, the result may be tubercular phthisis.

Pleurisy the last condition under our heading, which we have enumerated as a result of the abuse of alcohol, is always an accompaniment of chronic interstitial pneumonia (fibroid phthisis of some authors), which results directly from bronchitis, involving the deeper structures of the bronchial tubes (peri-bronchitis). It is also a constant accompaniment of pulmonary phthisis, where that portion of the lung covered by the pleura is involved; but in addition we may have pleuritis primarily as a direct result of the abuse of alcohol. This latter assertion has been proven by *post-mortem* examinations in patients who have died from acute alcoholism.

In the writing of this paper, which has been after careful study of my subject, I have not exaggerated the effects of this poison. Every statement I have made can be substantiated. And although I have always been fond of the pleasures of the table, with all that the term implies, and have suffered from sundry attacks of gout, which I cannot trace to hereditary predisposition, and which gave me opportunities for much needed rest from the arduous duties of my profession, my investigations have almost converted me to total abstinence.

The half has not been told by me.





